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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/507,536

03/08/2005

Theodor Graser

10191/3810

1368

26646 7590 09/15/2008

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EXAMINER

DINH, BACH T

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

09/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/507,536	Applicant(s) GRASER ET AL.	
	Examiner BACH T. DINH	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-16 and 19-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-16 and 19-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Summary

1. This is the response to the Amendments filed on 06/11/2008.
2. Claims 13-16 and 19-26 remain pending in current application.
3. The 35 U.S.C. 102(b) rejections of claims 13-14, 16 and 19-25 are withdrawn in view of Applicant's amendments.
4. The 35 U.S.C. 103(a) rejections of claim 26 are withdrawn in view of Applicant's amendments.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 16, 21, 23 and 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Addressing claim 16, the amended claim 13 recites the limitation "the recess is a slotlike-shaped recess that widens toward an outer face of the sensor element", which is a limitation of the second exemplary embodiment of current application as shown in figures 5-6 and in page 5 line 26 to page 6 line 9. However, the slotlike-shaped recess

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depicted in figures 5-6 does not “extend in the region of the at least one contact face over an entire width of the sensor element”; in fact, the limitations recited in claim 6 are from the first embodiment of current application, which is illustrated in figures 1-4. Therefore, the limitations of claim 16 are considered new matter.

Addressing claim 21, there is no support for the claimed "first electrical insulation layer ... including a recess in the region of the at least one contact face" in figures 5-6 for the second embodiment of current invention. In fact, figures 5-6 only illustrate layers 21, 22 and 23.

Addressing claim 23, there is no support for the claimed “a third layer ... includes a recess in a region of the further contact face”. In figures 5-6, layer 23 can constitute the claimed "a third layer"; however, layer 23 does not have a recess in a region of the further contact face.

Addressing claim 25, there are no support for the claimed “...one further layer ... which includes an additional recess" in the second embodiment of current application. In figures 5-6, layer 23 can constitute the claimed "one further layer"; however, layer 23 does not have an additional recess.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claim 26 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kato (US 5,879,525).

Addressing claim 26, Kato discloses a method for producing a sensor element constructed in layers for detecting a physical property of one of a gas (figures 1a-1b, 1:7-19), the method comprising:

Forming a first layer of the sensor element (7:35-41, forming layer 4b);

Forming a second layer of the sensor element (7:35-41, forming layer 4c), so that at least one contact face (surface of layer 4c where electrode 22 resides, electrode 22 comes in direct contact with the incoming gas; therefore, the exposed surface of layer 4c where electrode 22 resides is the claimed contact face) in a layer plane between the first and second layers (electrode 22 is formed in the plane between layers 4b and 4c); and

Forming, in the first layer, a recess (passages 14 and cavities 6, 8 formed in solid electrolyte layer 4b) in a region of the contact face by one of stamping, drilling and milling the recess in a green body of a ceramic sheet (14:40-48, Kato discloses that passages and cavities are formed by punching, which is equivalent to stamping, the green tapes of solid electrolyte layer 4b to form slots and hole; Kato discloses that the punching operations are used to form the slots and hole of the gas sensor in the second embodiment

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as illustrated in figures 2a-2b; however, it is inherent that the same punching operations are used for forming the cavities 6, 8 and the passages 12, 14 of the first embodiment as illustrated in figures 1a-1b),

In the alternative, one with ordinary skill in the art would have found it obvious to modify the method of Kato for forming the passages 12, 14 and cavities 6, 8 in the first embodiment as illustrated in figures 1a-1b with the punching operations of the second embodiment because the punching operations are used for forming the equivalent passage and cavity structures in the second embodiment as that of the first embodiment.

Therefore, one with ordinary skill in the art would have expected success when combining the punching operations with the method of producing the gas sensor of the first embodiment because the punching operations, separate or in combination, would not perform a materially different function.

Wherein the recess is formed as a slotlike-shaped recess that widens toward an outer face of the sensor element (in figure 1a, cavity 6 is wider than passage 14; therefore, the recess of Kato widens toward the outer face of the sensor element).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 13-16 and 19-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maurer et al. (US 4,294,679) in view of Muller et al. (US 4,334,974) and Liang (US 2002/0164897).

Addressing claim 13, in figure 3 Maurer discloses a sensor element (41), comprising:

A first layer (52);

A second layer (46); and

At least one contact face (electrode 50 and heating element 49) disposed in a layer plane (layer of electrode 50 and 49 between layers 52 and 46) between the first and second layers, the first layer include a recess (layer 52 is shorter than layer 46) in a region of the at least one contact face (electrode 50 and heating element 49 are exposed at the terminal region of layer 46 to permit an electrical connection (5:3-6, 6:4-7)).

Maurer fails to disclose the recess of the sensor element has a slotlike-shaped recess that widens toward an outer face of the sensor element.

Muller discloses an electrochemical sensor in figure 2; wherein, the sensing electrode 33 and conductive strip 33 is covered by a porous cover 34 that has a slot opening at the

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terminal portion so the conductive strip 33 can be contacted by suitable contacts, such as the connection leads 28 (connection leads 28 are shown in figure 1, 5:11-10).

Liang discloses terminal connector (figure 1); wherein, the terminal connector has a Y-shaped opening 21 and meanderline slot 22 communicates with the opening 21. The wire is guided through the slot 22 via opening 21 [0007, 0021].

Maurer and Muller are analogous arts for they disclose sensor element. At the time of the invention, one with ordinary skill in the art would have been motivated to modify the sensor of Maurer by fabricating a slot like opening in the cover plate 52 like that of Muller because the configuration of the porous cover 34 protects the connective strip and sensing electrode against the corrosive influence of gases as well as providing contact surface for the electrode (Muller 5:11-15).

Furthermore, one with ordinary skill in the art would have been motivated to modify the slotlike-shaped opening of Maurer and Muller with a Y-shaped opening like that of Liang because the Y-shaped opening, which guides electrical wire to the terminal connector (Liang, [0007, 0021]) would guide the contacts to the conductive strip of the sensing electrode of the modified gas sensor of Maurer and Muller.

Furthermore, one with ordinary skill in the art would have expected success when combining the Y-shaped opening of the terminal connector disclosed by Liang with the slotlike-shaped recess of the protective layer of Maurer and Muller because the Y-shaped opening of Liang, separate or in combination, would not perform a materially different function.

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Addressing claim 14, Maurer discloses that the sensor element is configured to detect one of a concentration of a gas component (1:11-16) and a temperature (7:35-38) of an exhaust gas of an internal combustion engine.

Addressing claim 15, in figure 3 Maurer discloses that the first (aluminum oxide cover plate 52) and second (zirconium dioxide electrolyte body 46) are ceramic substrate layers.

Maurer fails to disclose the thickness of electrolyte body 46 and cover plate 52.

Maurer discloses in another embodiment the electrolyte body 0.8 mm (4:31-44) and cover plate 52 has grooves with depth of 20 μm (8:1-6).

At the time of the invention, one with ordinary skill in the art would have been motivated to modify the second embodiment of Maurer to have the electrolyte body with thickness of 0.8 mm and the cover plate with thickness more than the depth of the grooves because the cover plate must be thicker than 20 μm (8:1-6) to support the grooves and provide structural integrity to the sensor. Therefore, one with ordinary skill in the art would have arrived at the claim thickness when fabricating the sensor of Maurer.

Addressing claim 16, the sensor of Maurer has recess extends in the region of the at least one contact face over an entire width of the sensor element (the recess creates by layers 52 and 46 extends over the entire width of the sensor element, figure 3).

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Muller discloses the slotlike recess of protective cover 34 extends in the region of the at least one contact face (in figure 2, region of the exposed conductive lead 33) over the width of the sensor element.

Maurer and Muller fails to disclose the slotlike recess extends in the region of the at least one contact face over an entire width of the sensor element.

Liang discloses the Y shape opening extends over the entire width of the terminal connector (figure 1).

At the time of the invention, one with ordinary skill in the art would have been motivated to modify the gas sensor of Maurer and Muller by making the Y shape opening as disclosed by Liang widens to entirely cover the width of the gas sensor because the widened opening would provide more receiving space for guiding the connection leads the conductive strip of the gas sensor.

Addressing claim 19, the sensor of Maurer further comprises (figure 3):

An electric element (electrode 50 or heating element 49) and a conductor tract (conductive tracts of the electrode 50 and heating element 49) arranged inside the sensor element, wherein at least one contact face is electrically connected to the electrical element via the conductor track (the end of the conductive tracts are exposed to permit an electrical connection (5:3-6) and the exposed portion is connected to the sensing portion of electrode 50 and heating portion of heating element 49).

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Addressing claim 20, Maurer discloses in figure 3 that the at least one contact face is electrically connected to one of an electrode (the exposed conductive tract of electrode 50) and a heating element (the exposed conductive tract of the heating element 49).

Addressing claim 21, the sensor element of Maurer further comprising:

A first electrical insulation layer (insulating cover layer 51, 7:62-63) arranged between the conductor track and the first layer, and including a recess (insulating layer 51 has the same length as cover plate 52 and is shorter than the electrolyte body 46, figure 3) in the region of the at least one contact face;

A second electrical insulation layer (electrically insulating layer 47, 7:58-61) arranged between the conductor track and the second layer, and between the at least one contact face and the second layer (figure 3).

Addressing claim 22, Maurer discloses that the conductive tracts are exposed to permit an electrical connection (5:1-6, 6:4-7).

Therefore, Maurer discloses a contact part (electrical connection) electrically connected to the at least one contact face (exposed conductive tracts) so that the electrical element (sensing portion 50 and heating portion 49), via the conductor track, the at least one contact face, and a contact part, is connected to the electrical wiring located outside the sensor element (5:1-6, 6:4-7).

Addressing claim 23, the sensor element of Maurer further comprising (figure 3):

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A third layer (42), wherein there is a further contact face (exposed portion of electrode 45) arranged in a layer plane (layer of electrode 45 between layers 46 and 42) between the second and third layers, and the third layer includes a recess in a region of the further contact face (layer 42 is shorter than electrolyte body 46; therefore, forming a recess that exposes the conductive tract of electrode 45).

Addressing claim 24, Maurer discloses the first layer (cover plate 52) forms an outer layer of the sensor element (the grooves of cover plate 52 provides a predetermined passage for oxygen molecules in the measuring gas (8:5-11)).

Addressing claim 25, Maurer discloses the sensor element further comprising (figure 3):

At least one further layer (47) which is arranged on the side of the first layer that is remote from the at least one contact face, and which includes additional recess (window 48).

12. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maurer et al. (US 4,294,679) in view of Muller et al. (US 4,334,974), Liang (US 2002/0164897) and Kato (US 5,879,525).

Addressing claim 26, Maurer discloses a method for producing a sensor element constructed in layers for detecting a physical property of one of a gas and a liquid, the method comprising (figure 3):

Forming a first layer of the sensor element (cover plate 52, 8:28-31);

Forming a second layer (electrolyte body 46, 4:31-34) of the sensor element so that at least one contact face (electrode 50 and heating element 49, 7:58-61) is disposed in a layer plane between the first and second layers; and

Forming, in the first layer, a recess (layer 52 is shorter than layer 46) in a region of the contact face (the exposed region of electrode 50 and heating element 49 for establishing electrical connection, 5:3-6).

Maurer fails to disclose forming the recess by one of stamping, drilling and milling in a green body of a ceramic sheet and wherein the recess is formed as a slotlike-shaped recess that widens toward an outer face of the sensor element.

Muller discloses a gas sensor; wherein, a porous cover 34 is formed with a slotlike-shaped recess (figure 2).

Liang discloses terminal connector (figure 1); wherein, the terminal connector has a Y-shaped opening 21 and meanderline slot 22 communicates with the opening 21. The wire is guided through the slot 22 via opening 21 [0007, 0021].

Kato discloses a method for producing a gas sensor with multiple layers; wherein, a slotlike-shaped recess (passages 12, 14 and cavities 6, 8) is formed in green tape solid electrolyte body 4b by punching operations to form slots and holes (14:40-48).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the method of Maurer by fabricating the cover plate to have the slotlike-shaped recess like the protective cover 34 of Muller and modify the slotlike-shaped recess to widen toward the terminal end of the sensor element like the Y-shape opening of the terminal connector disclosed by Liang because the configuration of the

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porous cover 34 protects the connective strip and sensing electrode against the corrosive influence of gases as well as providing contact surface for the electrode (Muller 5:11-15) and the Y-shaped opening would guide the contacts to the conductive strip of the sensing electrode (Liang, [0007, 0021]).

Furthermore, one with ordinary skill in the art would have been motivated to modify the method of Maurer, Muller and Liang by forming the slotlike-shaped recess that widens toward the outer face of the sensor element with punching the slots in the green ceramic body as disclosed by Kato because Kato discloses the punching operations are used for forming the recess with different widths (in figure 1a, passages 12, 14 are narrower than cavities 6, 8); therefore, the punching operation of Kato would be applicable in forming the slotlike-shaped recess with the Y-shaped opening for the gas sensor of Maurer, Muller and Liang. One with ordinary skill in the art would have expected success when combining the punching operations of Kato with the gas sensor manufacturing method of Maurer, Muller and Liang because the punching operation of Kato, separate or in combination, would not perform a materially different function.

Response to Arguments

13. Applicant's arguments filed 06/11/2008 have been fully considered but they are not persuasive.

14. With respect to Applicant's arguments III, IV, V, VIII and IX, the arguments are moot in view of the new rejections.

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15. With respect to Applicant's argument VII, that Liang fails to disclose the feature that the recess has a slotlike-shaped recess widens toward the outer face of the sensor element. Muller discloses the slot like opening of the porous cover 34 to provide contact between the conductive strip 33 and the connection leads 28 (connection leads 28 are illustrated in figure 1, 5:11-20); furthermore, the equivalent structure 39 also has slotlike-shaped recess to provide lateral access to the reference electrode 36 (figure 2, 5:42-45). In fact, all equivalent protective layers illustrated in figures 3-7 have slotlike-shaped recess to provide contact for the corresponding conductive strip. Liang discloses, in figure 1, a terminal connector with the Y-shaped opening 21 or the slotlike-shaped recess that widens towards the terminal end for guiding electrical wire into the slot 22 [0007 and 0021]. Furthermore, Examiner had already articulated that both Muller and Liang disclose terminal connections; wherein, the terminal connector of Liang has a Y-shaped opening for guiding electrical wire into the slot and one with ordinary skill in the art would have been motivated to modify the opening of the protective layer 34 of Muller with the Y-shaped opening of Liang to guide the contacts to the conductive strip of the sensing electrode (see rejection of claim 18 on page 9 in the previous office action). Furthermore, one with ordinary skill in the art would have expected success when combining the Y-shaped opening of the terminal connector disclosed by Liang with the slotlike-shaped recess of the protective layer of the modified gas sensor of Maurer and Muller because the Y-shaped opening of Liang, separate or in combination, would not perform a materially different function.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH T. DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

BD
09/12/2008